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L13: Entry 20 of 30 File: USPT Jun 6, 1989

DOCUMENT-IDENTIFIER: US 4837668 A
TITLE: Reflector for dental or medical light

Brief Summary Text (5):
Accordingly, the conventional design provides a protective layer of a PTFE (Teflon) paint over the dichroic coating on the rear surface of the glass substrate to aid in preventing damage to the coating. The paint coating layer is also utilized to diffuse light passing through the reflector thereby reducing undesirable glare from the rear of the reflector. Such a conventional reflector, however, provides a problem in that the protective diffuser paint coating on the rear surface of the glass substrate peels off after a period of use. This peeling also damages or destroys the dichroic coating on the rear surface of the substrate. Although it is not known for certain what causes such peeling, it is believed that one factor may be the tremendous temperature swings (e.g. from 25.degree. C. when the lamp is off to above approximately 150.degree. C. when the lamp is on) that the substrate and two coating layers are exposed to in combination with the differential thermal expansion rates of the several materials. Another factor would likely be any wiping contact with the coating during cleaning.

Brief Summary Text (6):
In addition to being unsightly, the flaking of the coating allows light to pass through the glass substrate producing a glaring out the back side of the reflector. The resulting loss of light is disadvantageous because onlookers from the rear side of the lamp are met with an intense glare and useful light intensity is diminished in the forward direction. This problem is presently dealt with by recoating the back surface of the glass substrate with another dichroic coating layer and a protective paint coating thereon. This, however, is done at considerable expense and works only until such time as the new coating begins to flake off.

Brief Summary Text (19):
Still another advantage of the present invention is the provision of an inexpensive reflector cover plate which can be readily retrofitted on reflector glass substrates which have suffered peeling problems either of the conventional PTFE paint coating thereon or of the conventional ceramic frit coating thereon.

Detailed Description Text (3):
With reference now to FIG. 1, the lighting device includes a frame 10 which comprises first and second side walls 12, 14 as well as top and bottom end walls 16, 18 which connect the side walls to each other. A handle 20 is provided on the frame and extends from each of the side walls as is illustrated better in FIG. 2. A light source 22 is provided in the frame behind a front portion 24 of the handle 20 as illustrated in FIG. 3 (the light source is not shown in FIGS. 1 and 2 so that the frame 10 can be more clearly illustrated). The handle front portion 24 can have a glass panel 26 located in an aperture in the front portion.

Detailed Description Text (15):
The cover plate 70 can be selectively attached to and removed from the rear surface of the glass substrate. Removal of the cover plate may be advantageous for sterilization purposes, such as autoclaving. Also, if the rest of the reflector assembly is eventually discarded due, for example, to cracks in the glass substrate or wiring problems in the electrical circuit of the lamp, the cover plate can be removed and retrofitted on another reflector assembly.

CLAIMS:

15. A lighting device for use in a dental or medical setting comprising:

a glass substrate of a predetermined shape for reflecting light in a predetermined pattern and having a front surface and a rear surface;

a frame means for holding said glass substrate;

a light source carried by said frame means for providing light to said glass substrate when energized; and,

a cover plate for covering said rear surface of said glass substrate, said cover plate having a reflective surface and also having a shape which can closely overlie said glass substrate, said cover plate being selectively secured in said frame means in overlying relation to said glass substrate rear surface.

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L13: Entry 23 of 30 File: USPT Mar 3, 1981

DOCUMENT-IDENTIFIER: US 4254455 A
TITLE: Reflector for dental, medical or the like lighting device

Abstract Text (1):
A reflector for use in a dental, medical or other lighting device wherein light from a light source is reflected thereby in a predetermined pattern for illumination of a desired zone. The reflector is formed of a glass substrate of predetermined shape for reflecting light in a predetermined pattern and has a dichroic coating on the front surface for reflecting a substantial portion of visible light and for allowing infrared and other undesirable energy along with some unreflected visible light to pass therethrough so that cool light only is reflected and a diffuser coating on the rear surface for diffusing light passing through the glass substrate to reduce undesirable glare from the rear of the reflector. The diffuser coating is preferably a ceramic frit.

Brief Summary Text (2):
An improved reflector for use in a dental, medical or the like lighting device wherein light from a light source is reflected thereby in a predetermined pattern for illumination of a desired zone.

Brief Summary Text (7):
By having the dichroic coating on the rear surface of the reflector, a problem of protection of such dichroic coating was presented inasmuch as the dichroic coating can be easily damaged by cleaning or handling of the reflector. Accordingly, the assignee of the present invention employed a protective TEFLON paint coating over the dichroic coating on the rear surface of the glass substrate of the reflector to aid in preventing damage to the dichroic coating.

Brief Summary Text (8):
This paint coating also advantageously served as a diffuser medium to diffuse light passing through the reflector to reduce undesirable glare from the rear of the reflector. Such glare is quite annoying and disrupting to a dentist, doctor or assistant who is utilizing such lighting device and the diffuser paint coating acts in a similar manner to a lampshade over an ordinary household lamp.

Detailed Description Text (4):
The lighting device 10 further includes a light source 14 which may be any conventional type of light bulb normally utilized in these types of lighting devices. The light source 14 is suitably carried by the frame 12 in the manner generally and schematically illustrated in FIGS. 2 and 3 and more particularly illustrated in assignee's aforementioned co-pending application.

Detailed Description Text (5):
The lighting device further includes a reflector 20 suitably carried by the frame 12 and disposed behind the light source 14, as shown in FIGS. 2 and 3, for reflecting light in a predetermined pattern. The predetermined pattern of reflected light is determined by the shape of the reflector 20 and the positioning of the light source 14. These do not form a part of the present invention and will not be described in detail herein; however, the shape of the reflector and positioning of the light source may be in accordance with the teachings of U.S. Pat. No. 4,149,227, issued Apr. 10, 1979.

Detailed Description Text (8):
As is well known, a conventional light source gives off energy in a wide range of wave lengths. It gives off ultraviolet energy, energy in the visible spectrum or

light, infrared energy which is often thought of as heat, X-rays, etc. It is desirable to reflect only the visible energy or light so that the pattern of light reflected onto the predetermined zone of a patient in dental or medical use will be a cool light and will not be hot so as to adversely affect the illuminated region of the patient. Accordingly, the dichroic coating 22 will reflect only the visible light or cool light and will allow the other undesirable energy to pass through such coating and through the glass substrate 21 of the reflector 20.

Detailed Description Text (9):
Also, these dichroic coatings are not 100% efficient and some of the visible light will also pass therethrough and through the reflector 20. The unreflected visible light along with the other undesirable energy will appear as a red ball when viewing the rear of the reflector 20 or the lighting device 10 and is quite annoying to the dentist, doctor or assistant utilizing the lighting device 10. The effect may be analogized to looking into a lamp without a shade thereon.

Detailed Description Text (10):
Accordingly, in accordance with this invention, the lighting device 10 further includes a diffuser coating 23 on the rear surface of the glass substrate 21 of the reflector 20 for diffusing light passing through the glass substrate 21 to reduce undesirable glare from the rear of the reflector 20. This is similar to the effect achieved by placing a lampshade on a lamp. In the drawings, the reflecting of light, the passing of light through the substrate 21 and the diffusing of light by the diffuser coating 23 have been illustrated schematically by the arrows in FIGS. 2 and 3.

CLAIMS:

1. A reflector for use in a dental, medical or other lighting device wherein light from a light source is reflected thereby in a predetermined pattern for illumination of a desired zone; said reflector comprising:

a glass substrate of predetermined shape for reflecting light in a predetermined pattern and having a front surface and a rear surface;

dichroic coating means on said front surface of said glass substrate for reflecting a substantial portion of visible light and for allowing infrared and other undesirable energy along with any unreflected visible light to pass through said glass substrate so that cool light only is reflected; and

diffuser coating means on said rear surface of said glass substrate for diffusing light passing through said glass substrate to reduce undesirable glare from the rear of said reflector.

2. A reflector for use in a dental, medical or other lighting device wherein light from a light source is reflected thereby in a predetermined pattern for illumination of a desired zone; said reflector comprising:

a glass substrate of predetermined shape for reflecting light in a predetermined pattern and having a front surface and a rear surface;

dichroic coating means on said front surface of said glass substrate for reflecting a substantial portion of visible light and for allowing infrared and other undesirable energy along with any unreflected visible light to pass through said glass substrate so that a cool light only is reflected; and

ceramic frit coating means fused to said rear surface of said glass substrate for diffusing light passing through said glass substrate to reduce undesirable glare from the rear of said reflector.

3. A lighting device for illuminating a desired zone of a patient to facilitate dental, medical or the like procedures, said lighting device comprising:

a frame of predetermined desired configuration;

a light source carried by said frame for providing light when energized; and

a reflector carried by said frame and disposed behind said light source for reflecting the light from said light source in a predetermined pattern and

comprising a glass substrate of predetermined shape having a front surface adjacent said light source, and a rear surface, dichroic coating means on said front surface of said glass substrate for reflecting a substantial portion of visible light and for allowing infrared and other undesirable energy along with any unreflected visible light to pass through said glass substrate so that cool light only is reflected, and diffuser coating means on said rear surface of said glass substrate for diffusing light passing through said glass substrate to reduce undesirable glare from the rear of said reflector.